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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,460	03/16/2004	Andrew D. Bailey III	LAM2P460	4012
25920	7590	12/20/2005	EXAMINER	
MARTINE PENILLA & GENCARELLA, LLP			KANG, DONGHEE	
710 LAKEWAY DRIVE				
SUITE 200			ART UNIT	PAPER NUMBER
SUNNYVALE, CA 94085			2811	

DATE MAILED: 12/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/802,460	Applicant(s) BAILEY ET AL	
	Examiner Donghee Kang	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 13 October 2005.  
 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-16 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/26/04 &amp; 10/7/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 1, the phrase **"the first temperature being sufficient to cause a first species to become volatile, the first species being one of a plurality of species deposited on the inner surface"** is unclear. The inner surfaces are heated to a range of about 200 to about 400 degrees C (See claim 14). However, the specification discloses the first species (CuCl<sub>2</sub>, CuCl), which is deposited on the inner surface are not volatile at the claimed temperature ranges (See paragraph 37).

Re claim 1, the phrase **"the cleaning chemistry being reactive with a second one of the plurality of species to convert the second species to the first species"** is unclear.

The cleaning chemistry reacts with second species (non-volatile metal) to cause the second species to become volatile metal (See Fig.3B). The first species is not volatile metal, which is one of a plurality of species deposited on the inner surface as claimed in claim 1.

Claims 2-16 are rejected because each includes the limitations of independent claim 1.

The examiner disregards the phrase "heating an inner surface..., the first species being one of a plurality of species deposited on the inner surface" and only consider the phrase "injecting a cleaning chemistry into the process chamber.... to convert the second species to the **first species**". The examiner interprets the term the first species" as a volatile species as described in the claim 1 for further consideration.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims **1-4, 6, 11 & 16** are rejected under 35 U.S.C. 102(a) as being anticipated by Qian et al. (US 6,699,399).

Re claim 1, Qian et al. teach a method for cleaning a processing chamber comprising:

Injecting a cleaning chemistry into the processing chamber, the cleaning chemistry being reactive with a nonvolatile residues (byproducts) deposited on the inner surface of chamber to convert the volatile species and outputting the volatile species from the processing chamber (Col.9, line 46 – Col.12, line 12).

Re claim 2, Qian et al. teach the process chamber including a substrate (Fig.2).

Re claim 3, Qian et al. teach the method further comprising etching a surface of the substrate at substantially the same time as the processing chamber is being cleaned.

Re claim 4, Qian et al. teach etching the surface of the substrate includes etching a multi layered thin film stack on the substrate in a single chamber (Fig.1).

Re claim 6, Qian et al. teach the substrate is supported by a chuck (Fig.2).

Re claim 11, Qian et al. teach injecting the cleaning chemistry into chamber including reducing the nonvolatile species.

Re claim 16, Qian et al. teach the cleaning chemistry includes at least one of a group consisting of a halogen gas, an inert gas and a hydrogen-containing gas.

### ***Response to Arguments***

5. Applicant's arguments filed 10-13-05 have been fully considered but they are not persuasive.

Applicant argues that the first species are  $\text{Cu}_3\text{Cl}_3$  which is deposited on the inner surface of the process chamber. This is not convincing.

[37]  $\text{Cu}_3\text{Cl}_3$  is volatile while  $\text{CuCl}_2$ ,  $\text{CuCl}$  and elemental copper may not be volatile. A non-volatile first portion of the etch byproducts (e.g.,  $\text{CuCl}_2$ ,  $\text{CuCl}$  and elemental copper) can be deposit on the inner surfaces of the process chamber even at temperatures well above 200 degrees C. A second, volatile portion of the etch byproduct (e.g., the  $\text{Cu}_3\text{Cl}_3$ ) is output from the process chamber.

[38] However, as a second portion of the  $\text{Cu}_3\text{Cl}_3$  cools (e.g., as the  $\text{Cu}_3\text{Cl}_3$  contacts a cooler surface such as the inner surface of the process chamber), the second portion is converted to  $\text{CuCl}_2$ , which is not volatile at the process temperature. Therefore, while  $\text{Cu}_3\text{Cl}_3$  is formed during the etch process, a layer of  $\text{CuCl}_2$  can be formed on the inner surfaces of the process chamber.

Byproduct  $\text{Cu}_3\text{Cl}_3$  is never deposited on the inner surface of process chamber because at lower temperature byproduct  $\text{Cu}_3\text{Cl}_3$  is converted to  $\text{CuCl}_2$  (see Fig.3 and

above paragraph). Therefore, there is no byproduct  $\text{Cu}_3\text{Cl}_3$  on the inner surface of the process chamber.

***Conclusion***


6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 571-272-1656. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Loke can be reached on 571-272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Donghee Kang, Ph.D.  
Primary Examiner  
Art Unit 2811

dhk